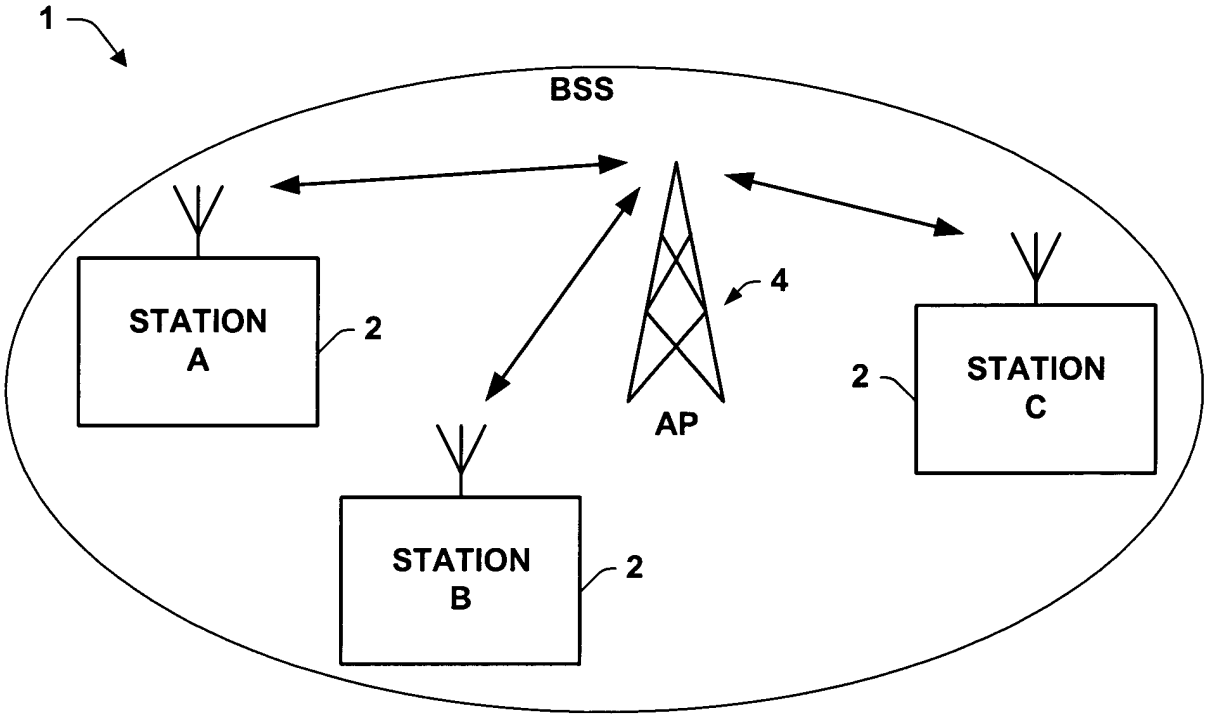

FIG. 1
PRIOR ART

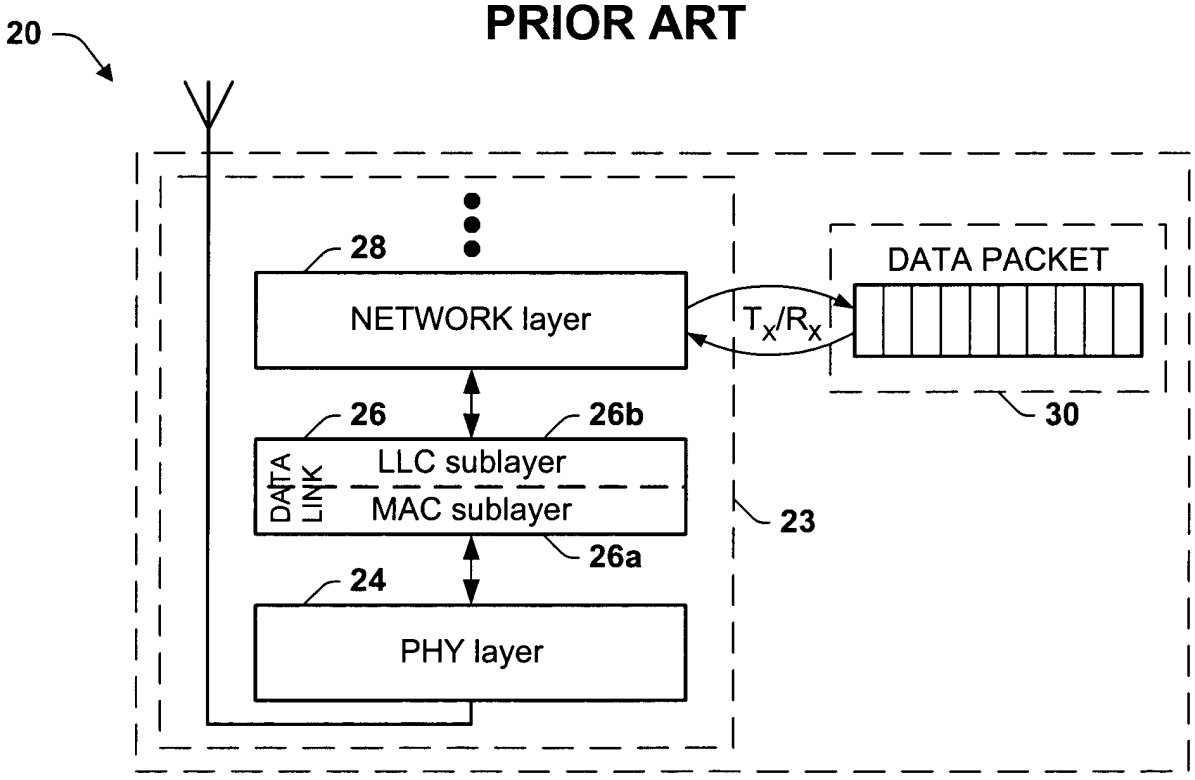

FIG. 2
PRIOR ART

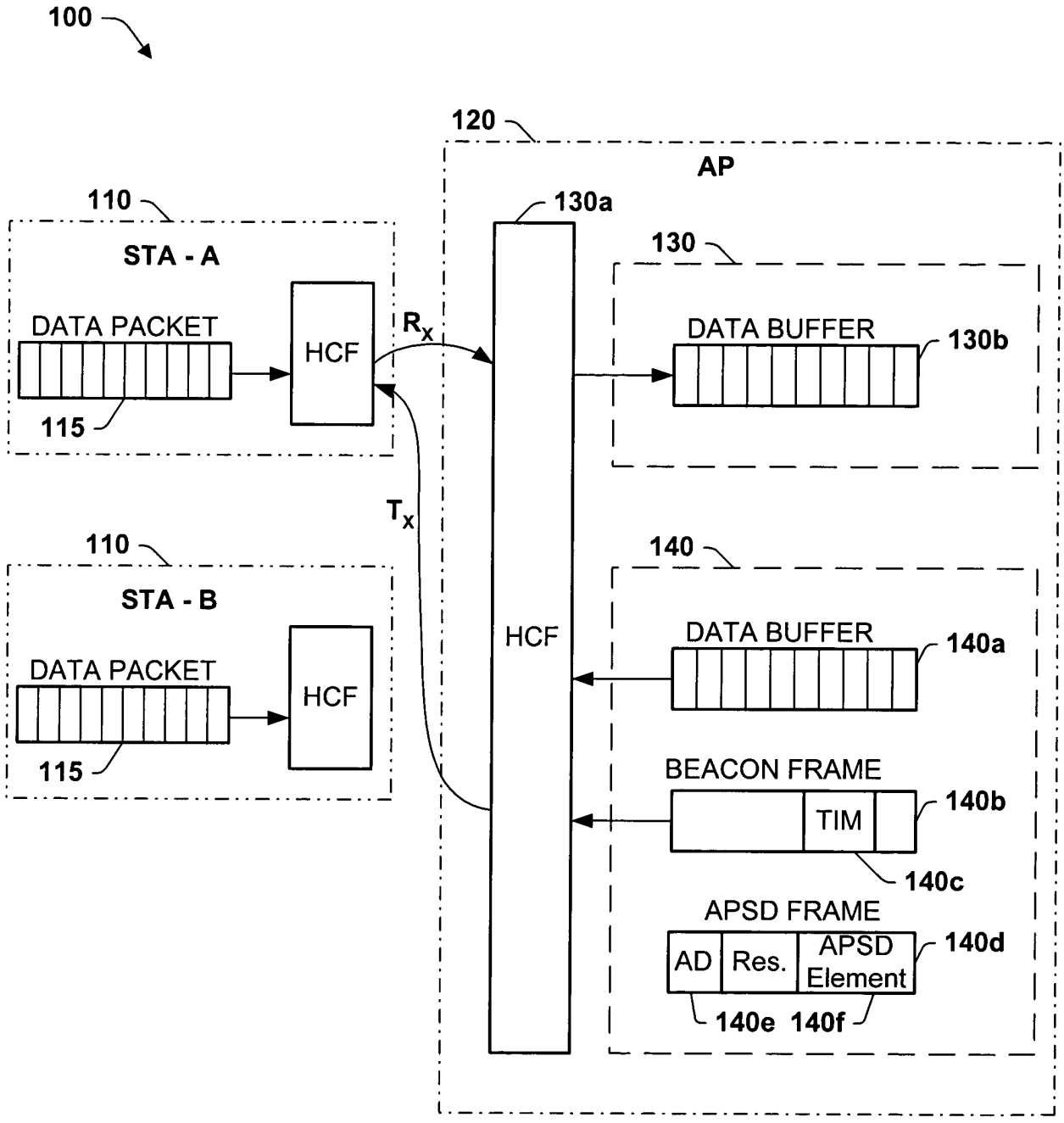
100
120
AP
110
STA - A
130a
130
DATA PACKET
HCF
R_X
DATA BUFFER
130b
115
T_X
110
STA - B
140
HCF
DATA BUFFER
140a
DATA PACKET
HCF
115
BEACON FRAME
TIM
140b
140c
APSD FRAME
AD
Res.
APSD Element
140d
140e
140f

FIG. 3

200

Inter-Frame Spaces for 802.11B DSSS (μs.)

SLOT TIME	SIFS TIME	PIFS TIME	DIFS TIME
20	10	30	50

FIG. 4

230

Automatic Power-Save Delivery Action Frame

235 FIELD NAME	240 ACTIVATION DELAY	245 RESERVED	250 APSD ELEMENT
OCTETS	1	1	4

FIG. 5A

232

APSD ELEMENT

235 FIELD NAME	280 ELEMENT ID (43)	285 LENGTH (2)	290 WAKEUP PERIOD	295 BEACON OFFSET
OCTETS	1	1	1	1

FIG. 5B

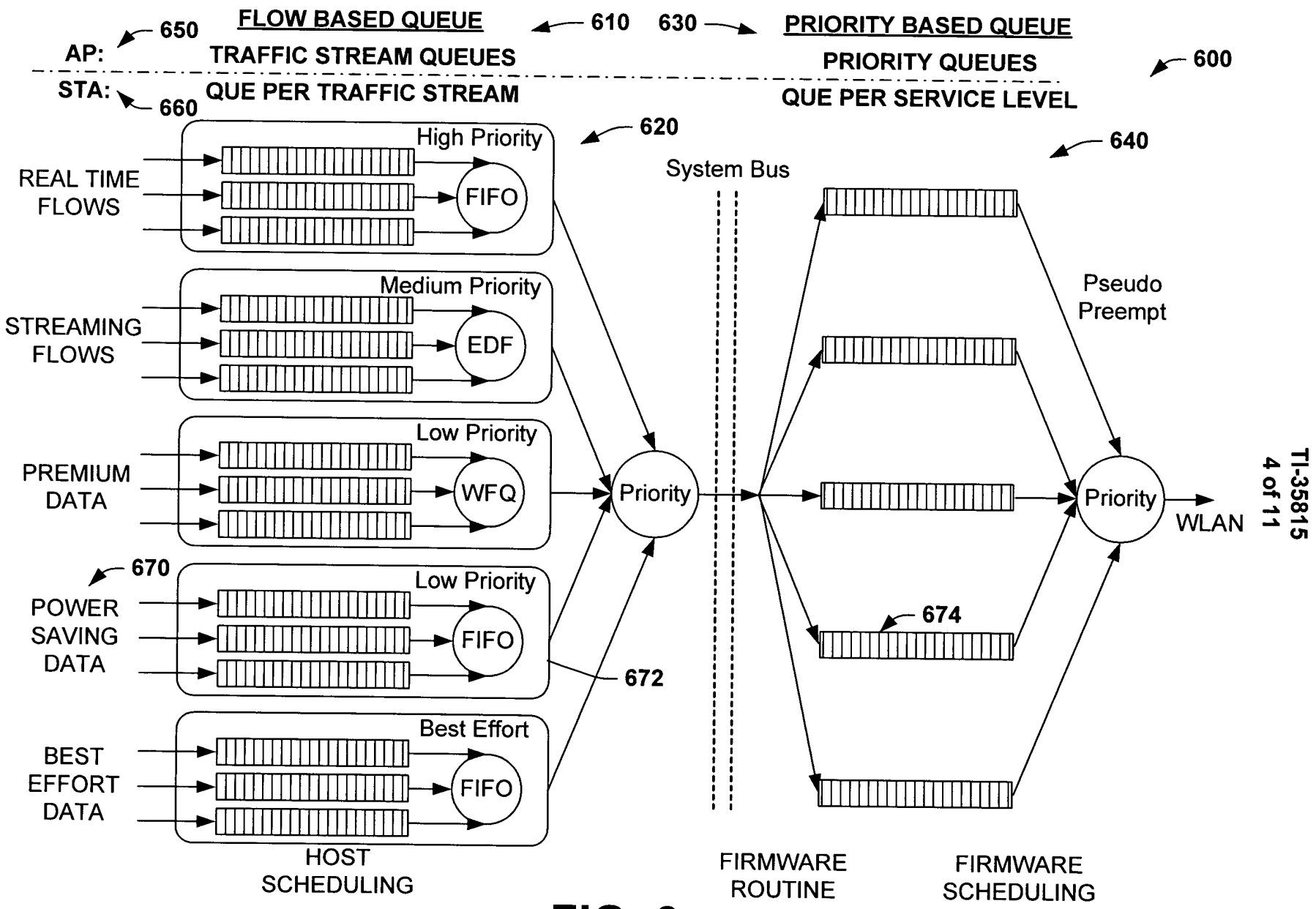
650
AP:
STA:
660
FLOW BASED QUEUE
TRAFFIC STREAM QUEUES
QUE PER TRAFFIC STREAM
610
630
PRIORITY BASED QUEUE
PRIORITY QUEUES
QUE PER SERVICE LEVEL
600
620
640
High Priority
FIFO
REAL TIME FLOWS
Medium Priority
EDF
STREAMING FLOWS
Low Priority
WFQ
PREMIUM DATA
670
Low Priority
FIFO
POWER SAVING DATA
672
Best Effort
FIFO
BEST EFFORT DATA
System Bus
Priority
Pseudo Preempt
674
Priority
WLAN
HOST SCHEDULING
FIRMWARE ROUTINE
FIRMWARE SCHEDULING
TI-35815
4 of 11

FIG. 6

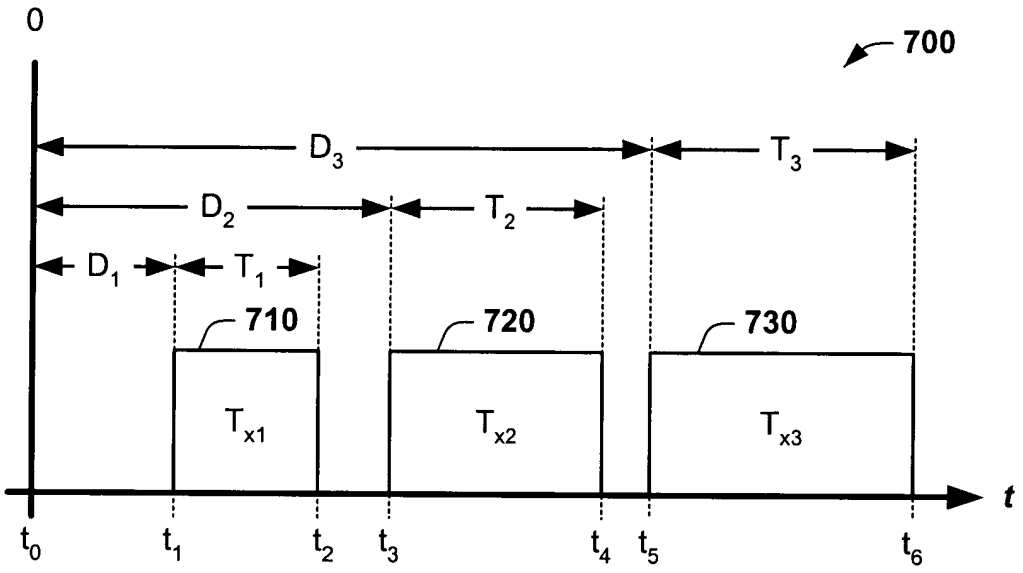

FIG. 7

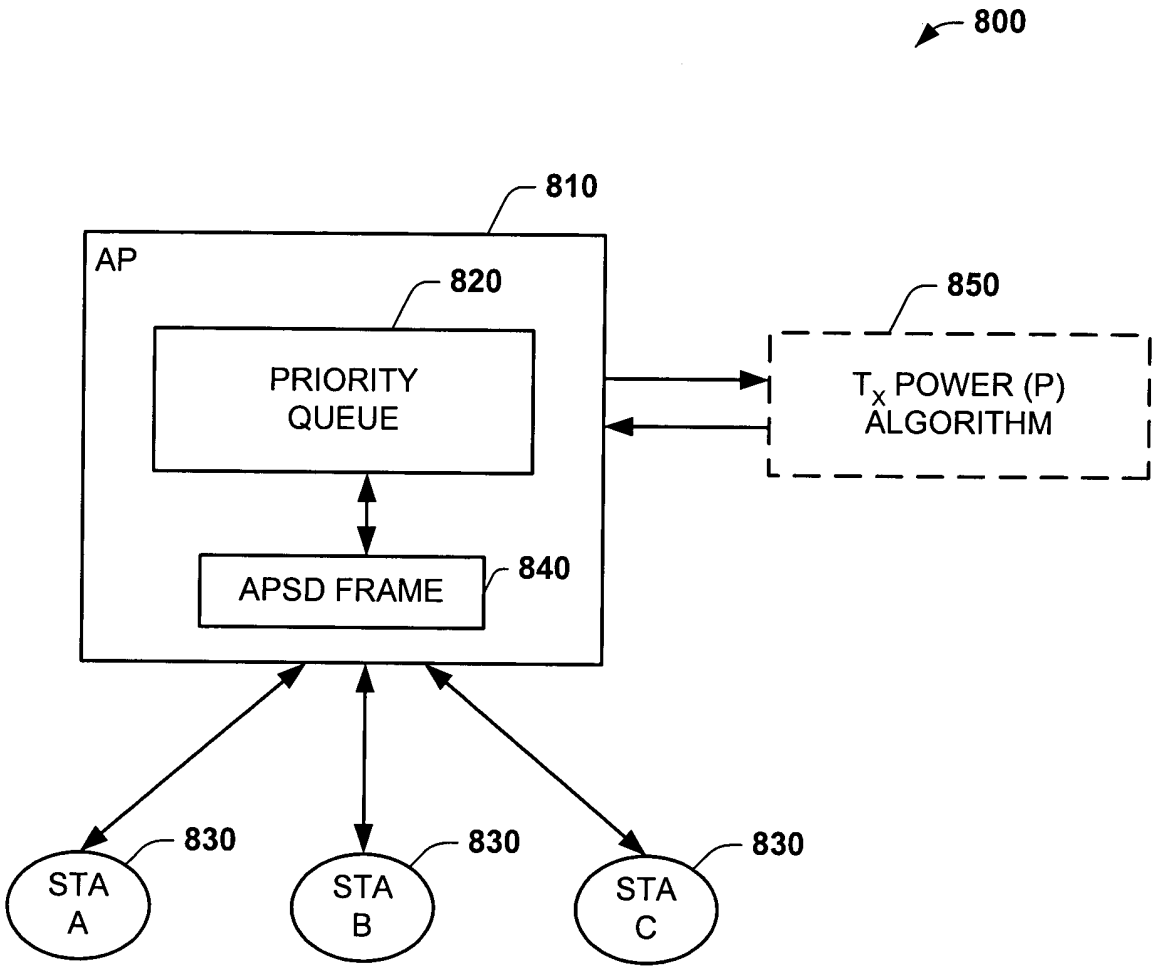
800
810
AP
820
PRIORITY QUEUE
850
T_X POWER (P) ALGORITHM
APSD FRAME
840
830
STA A
830
STA B
830
STA C

FIG. 8

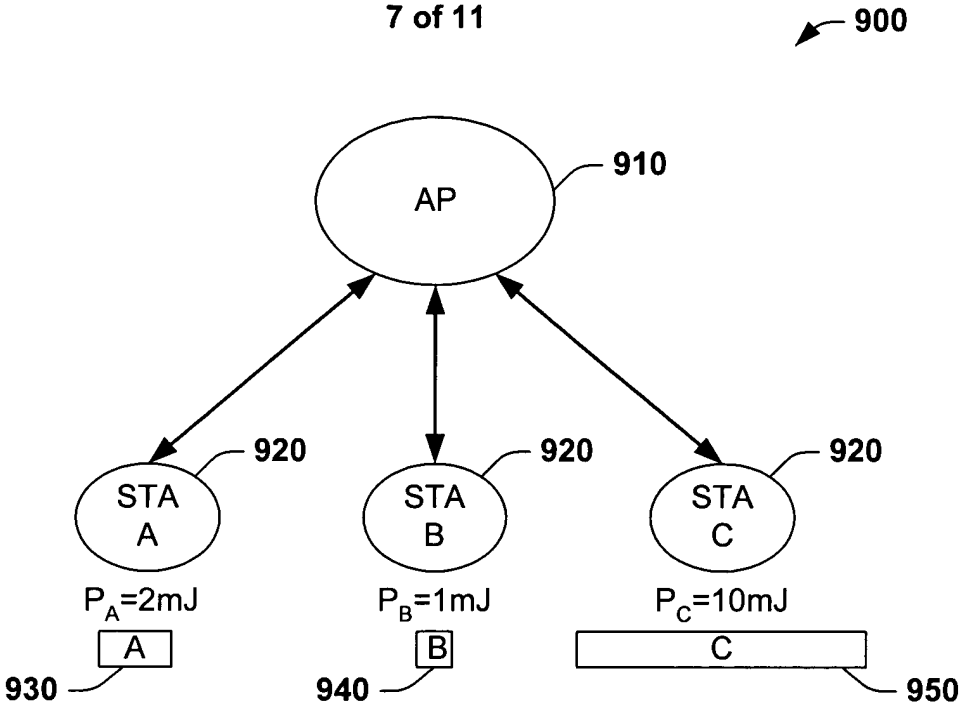

FIG. 9

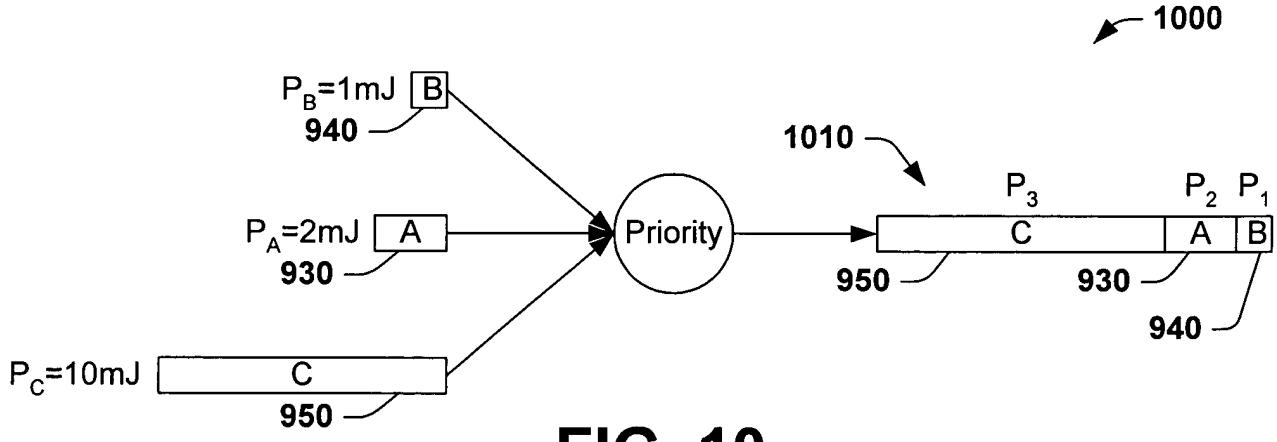

FIG. 10

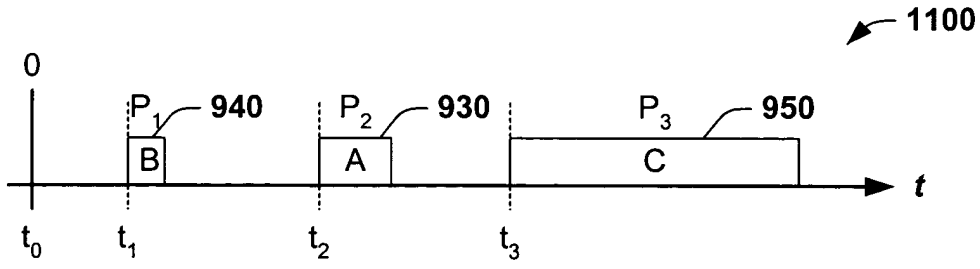

FIG. 11

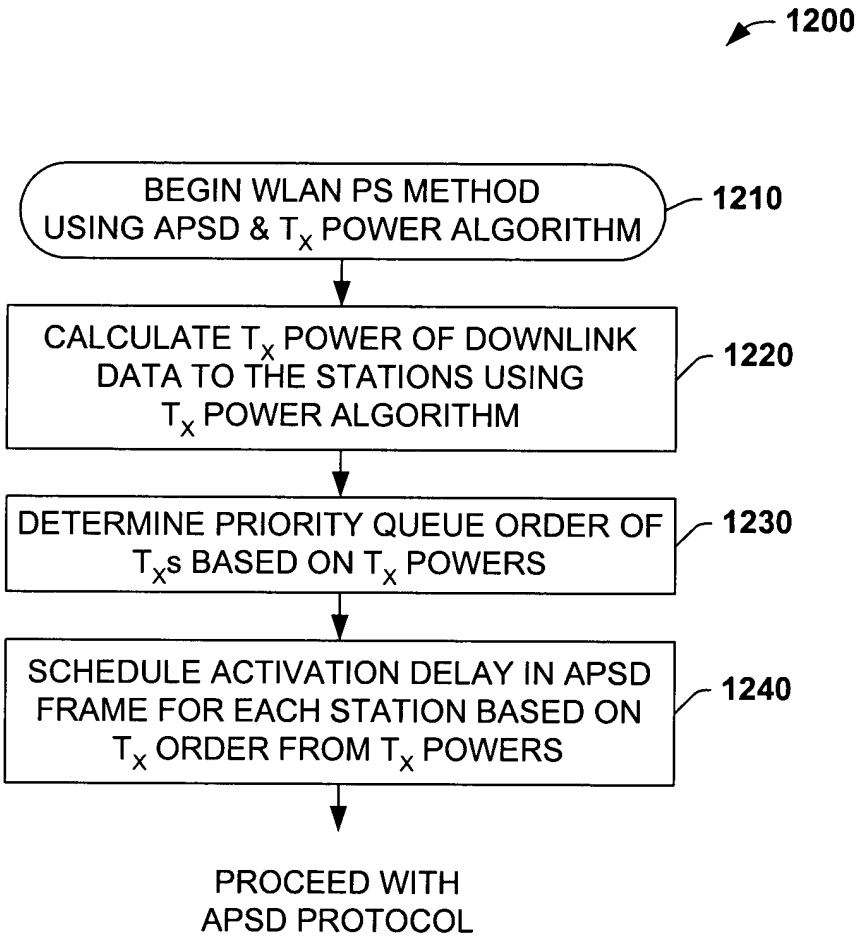
1200
BEGIN WLAN PS METHOD USING APSD & T_X POWER ALGORITHM
1210
CALCULATE T_X POWER OF DOWNLINK DATA TO THE STATIONS USING T_X POWER ALGORITHM
1220
DETERMINE PRIORITY QUEUE ORDER OF T_Xs BASED ON T_X POWERS
1230
SCHEDULE ACTIVATION DELAY IN APSD FRAME FOR EACH STATION BASED ON T_X ORDER FROM T_X POWERS
1240
PROCEED WITH APSD PROTOCOL

FIG. 12

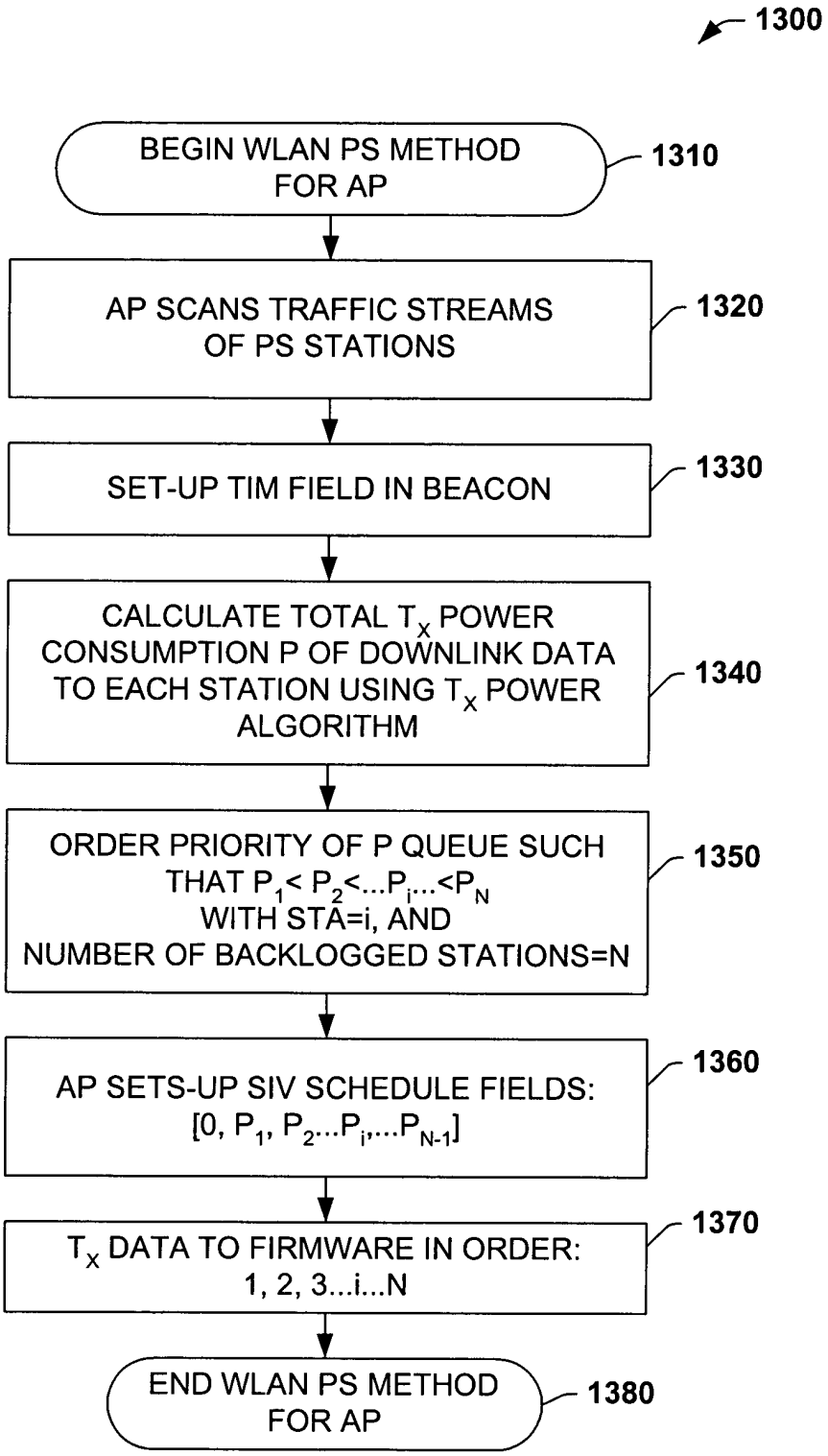
1300
BEGIN WLAN PS METHOD FOR AP
1310
AP SCANS TRAFFIC STREAMS OF PS STATIONS
1320
SET-UP TIM FIELD IN BEACON
1330
CALCULATE TOTAL T_X POWER CONSUMPTION P OF DOWNLINK DATA TO EACH STATION USING T_X POWER ALGORITHM
1340
ORDER PRIORITY OF P QUEUE SUCH THAT $P_1 < P_2 < ... P_i ... < P_N$ WITH STA=i, AND NUMBER OF BACKLOGGED STATIONS=N
1350
AP SETS-UP SIV SCHEDULE FIELDS: $[0, P_1, P_2 ... P_i, ... P_{N-1}]$
1360
T_X DATA TO FIRMWARE IN ORDER: 1, 2, 3...i...N
1370
END WLAN PS METHOD FOR AP
1380

FIG. 13

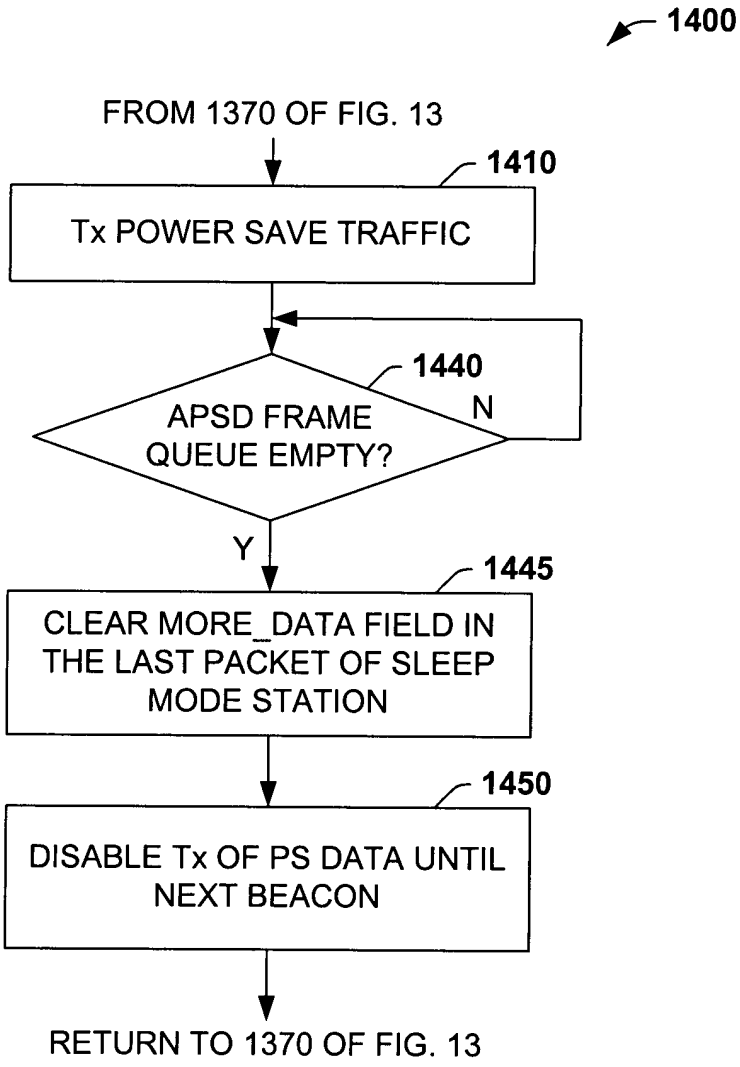
1400
FROM 1370 OF FIG. 13
1410
Tx POWER SAVE TRAFFIC
1440
APSD FRAME QUEUE EMPTY?
N
Y
1445
CLEAR MORE_DATA FIELD IN THE LAST PACKET OF SLEEP MODE STATION
1450
DISABLE Tx OF PS DATA UNTIL NEXT BEACON
RETURN TO 1370 OF FIG. 13

FIG. 14

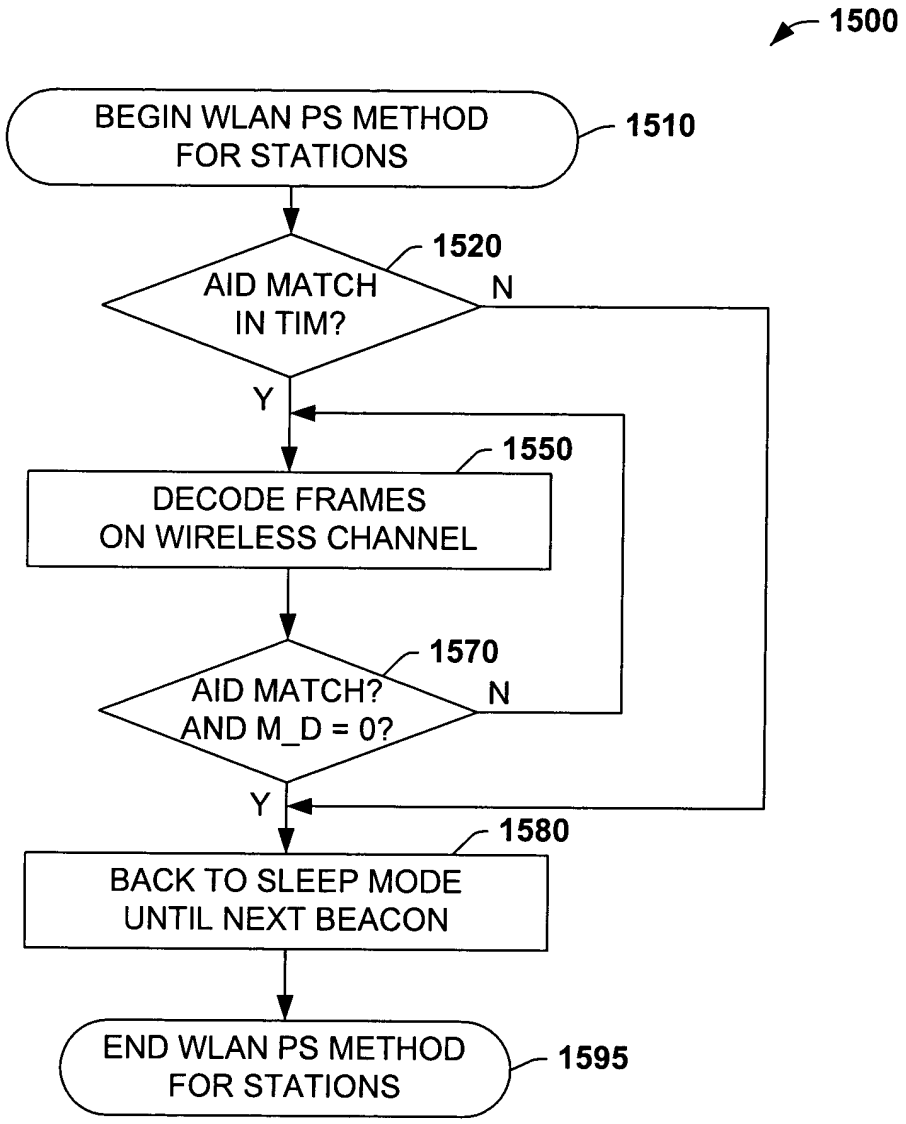
1500
BEGIN WLAN PS METHOD FOR STATIONS
1510
1520
AID MATCH IN TIM?
N
Y
1550
DECODE FRAMES ON WIRELESS CHANNEL
1570
AID MATCH? AND M_D = 0?
N
Y
1580
BACK TO SLEEP MODE UNTIL NEXT BEACON
END WLAN PS METHOD FOR STATIONS
1595

FIG. 15